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ABSTRACT

Considerations in conducting a study of salary equity for administrative faculty are addressed. The focus is whether there is a systematic difference in salary of administrative faculty based on race, sex, or age after all legitimate factors are removed. After defining the study population, attention is directed to the study model and research variables and measures. The analysis involved 254 full-time, permanent faculty, excluding college deans, athletics faculty, extension agents, and those with a rank of vice-president or higher. The multi-stage, single equation regression model is explained. The hierarchical position of each administrative faculty position was ranked, as were the supervisory responsibility and budgetary authority of each position. Additional study variables included the regional market value of each position, the individual's highest degree, the number of years in the position, professional experience, and individual performance in the position. Using these variables, the university-wide model explained 77 percent of the variance in salaries. Value issues that arise regarding salary equity studies are identified, and the importance of gaining support of high-level administrators for conducting such studies is emphasized. (Contains 15 references.) (SW)

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ISSUES IN STUDYING ADMINISTRATIVE FACULTY SALARY EQUITY

by

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Presented at

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for Management Research, Policy Analysis, and Planning

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Jean Endo
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ISSUES IN STUDYING ADMINISTRATIVE FACULTY SALARY EQUITY

Paul Brozovsky and Gerald McLaughlin

Introduction:

There have been many studies revolving around the issue of salary equity for faculty. This issue was one of the chapters in the recent Primer for Institutional Research. In addition several papers and a workshop were presented at the 1994 AIR national conference. However, virtually all of these activities have focused on the instructional faculty of the institution. There is another group of faculty on many of our campuses, the administrative faculty. This group is neither fish nor foul. They are not classified, but at the same time they do not have the discipline relationship of the instructional faculty. In reality, those in the business side of the enterprise do not have the link with the traditional professoriate, those in the academic side often have discipline linkages but they have at least temporarily left their discipline to work in administrative and managerial roles.

While this group of faculty is important, the traditional wisdom has been that their salaries can not be modeled in the same manners as one might approach the instructional faculty. In most studies, they are the first group removed from the study to form a sample which is more likely to have a comparable reward structure, which can be more effectively modeled.

The study

We have performed the traditional instructional faculty salary analysis for several years (Snyder, et. al., 1994). The analysis of the salaries of the administrative faculty was an extension of our previous studies. As an extension, this study used methodology

similar to that generally used in studies of instructional faculty but applied them to the administrative and professional faculty. The purpose of the study was to determine if there was a systematic difference in salary based on race, sex or age that was not explainable by objective factors that could legitimately be used to determine salaries. As such, the primary focus was on equity. At the same time, there was concern about the other factors of competitiveness and comparability. Senior administrators were concerned that various senior management areas be comparably competitive.

This paper will discuss some of the issues and problems we faced in conducting this study. These can be grouped into four primary areas: a) Who should be included in the study? b). What model should be used for the study? c). What variables should be included in the study? and d). What measures are available for these variables?

While these questions are presented in a sequence, bear in mind that the actual process of making decisions in these areas is iterative as decisions in one area affect the decisions made in another area. For example, the availability of measures will affect the variable that will be included in the study. The availability of measures may also affect the decision to include a particular individual or group in the study. For example, the value added to the institution may be a valid factor in determining an individual's pay, however, for most individuals there is no objective measure of value added available.

Who should be included in the study?

The most important issue in any study is defining the population to be included in the study. This is particularly true when studying as amorphous a group as the administrative and professional faculty. Ideally you would like to have as large a group as possible. However, the study should only include individuals

whose bases for pay (and increases in pay) are essentially the same. That is, each salary process requires a separate model.

On any campus there will be many groups and individuals that need to be specifically considered to determine if they should be included in the study. Specifically, the question should be asked for each group: Is the process used to determine salaries for the group sufficiently similar to the process used to determine the salaries of the primary group to allow its inclusion in the study?. Groups which we considered to determine whether or not they should be kept in the study included the library, the student health physicians, the commandant's office, the athletics department, extension agents, and the offices of the deans of the colleges. We excluded the athletics department since their pay is dependent on their won/lost record and how much money their sport brings in to the university. We excluded the extension agents since they only recently became faculty after being classified staff for a long time. We excluded the offices of the deans of the colleges since their salaries tend to reflect more their academic qualifications rather than their administrative qualifications. We retained the library, student health physicians, and commandants office. We also excluded all individuals with a rank of Vice President or higher and would strongly recommend that these individuals be excluded from such studies elsewhere. It is much easier to get people to act on salary discrepancies if their salary is not involved. Thus we included all full-time, permanent faculty who were not assigned to a specific college, were not in athletics, were not extension agents, and were not at a rank of vice-president or higher. Using this definition, we had 254 individuals in the study.

What model should be used for the study?

There are two components that must be considered when determining what model to use for this study. First the model must

be statistically correct, appropriate for the type of data and level of measurement, and capable of detecting economically significant differences. Secondly, the decision makers must feel sufficiently comfortable with the model that they are willing to use the results as a basis for making decisions. The purpose for which the study is going to be used should drive the decision as to which model will be used. The processes being modeled also play a critical role in determining the 'best' model.

There are several different models that have been used in studying academic faculty salary equity. Most of these models use regression analysis to determine the occurrence of discriminatory practices. Moore (1993a, 1993b) analyzed three of these methods to determine the differences between them.

The most commonly used model is a single equation with sex as a factor. The regression coefficient on sex is then used as the difference in salary due to sex. McLaughlin et. al. (1983) showed this to be an improper interpretation of the regression coefficient where there is multi-collinearity between the other independent variables and the characteristic of concern. Unfortunately it is still used, perhaps because of its simplicity and the failure to understand the impact of collinear variables. This is one of the models reviewed by Moore (1993a, 1993b).

Scott (1982) applied to higher education a model whereby the regression was run using only male faculty, with female salaries being predicted from this equation. This "Best-White-Male-Model" is an adaptation of a model proposed by Oaxaca (1973) and Blinder (1973). This is another of the frequently used models and was also reviewed by Moore (1993a, 1993b). This model requires the assumption that the traditional male reward structure is the correct reward structure. Operationally this works best if there is an overlap of the entire reward space by males.

Reimers (1983) and Neumark (1988) provide further adaptations of the model of Oaxaca (1973) and Blinder (1973). Reimers suggests computing ,regression equations separately for men and women and then using the midpoint as the 'correct' model. Neumark, on the other hand, suggests computing a combined regression as well as the separate male and female regressions and using the combined regression as the 'correct' model.

Snyder et al (1994) use a modification of the single equation model. They conduct the regression using both men and women but without the suspect category data (age, sex, race, etc.). The residuals are then analyzed to determine if any of these impermissible factors had an independent effect on salaries. This two step procedure eliminates the confounding of the effect of other characteristics on the computation of the role played by the categorical characteristic. This is the model that we modified for this study.

This study was designed to determine if there was any systematic difference in the pay scales based on age, race, or sex after all legitimate factors were removed. We used a multi-stage, single equation regression model with everyone included. The first stage created a university-wide model using all the variables except management area (department), race, sex, and age. This stage was run using both a linear model and a log-log model. These two models explained a similar amount of the variation in the salaries and had residuals with similar distributions (once the log-log model residuals were transformed back to dollars). We then averaged the residuals for each individual for further analysis. The effect of the management area was then removed and the residuals analyzed for any effects due to race, sex, and age. This model allowed us to test for specific discriminatory patterns while taking into account the local relationships between management areas.

What variables should be used in the model?

The salary a person receives is dependent on the position the person occupies and individual characteristics that the person brings to that position. If the salary is dependent solely on the position then the system meets the requirements for a pure bureaucracy as described by Weber. On the other side the Marxist creed 'from each according to his ability, to each according to his need' describes a structure where an individual's reward is based solely on personal characteristics. The university's administrative structure lies somewhere between these two extremes but with a decided bureaucratic bent.

Because of the bureaucratic tilt of university administrations, position factors should predominate in any model predicting the salaries of administrators. The total of all the position factors could be termed the 'local market value' of the position. This is the value of the position to the institution with out regard to the attributes of the person who occupies the position. The difference between the 'local market value' and the actual salary of the person in the position is the value of the personal factors that the individual brings to that position.

However, neither the 'local market value' nor the value of the personal factors can be measured in a single consistent unbiased fashion. Thus we determined those factors for which we might be able to obtain measures that could go into forming the 'local market value' or the personal factors portions of the individuals salary. The 'local market value' factors included regional market value, hierarchical position, supervisory responsibility, budgetary authority, and the management area for the position. The individual factors

that were considered included education, professional experience, years in the position, and individual performance in the position.

What measures are available for these variables?

Unfortunately, many of the variables listed above are not easily measured nor are the data readily available. Thus each institution should seriously examine the availability of data for measures for each of these variables. Other variables may also be used such as the technical complexity of the position requirements or any legally mandated requirements for the position. Interactions among the variables should be thoroughly investigated. It is seldom correct to assume that there are no interactions particularly when using surrogate measures that may not totally capture the variance in the underlying variable.

For this study, we had people who were familiar with the administrative structure estimate the rank (hierarchical position) of each administrative faculty position on a 4-point scale and the supervisory responsibility and budgetary authority of each position on a 3-point scale. We used the management areas as defined by our payroll system except that we created separate areas for the library and student health services.

We estimated the regional market value of each position based on information from the CUPA Survey of Administrative Salaries. We had CUPA send us information about a subset of their sample that included only our peer institutions. For positions included in their survey we used the median salary for our peer institutions as our regional market value. For those positions that were not included in the survey we estimated the regional market value by calculating the rank adjusted average median salary within management area for those positions that were included in the

survey and then adjusting the result for the rank of the individual position. This adjustment came from determining that there was a constant ratio between the average salary of those at the various ranks within a management area. This then allowed computing of area rank salary averages for those in positions not named in the CUPA study. This rather circumlocuitous process produced a 'regional market value' variable that explained about 60% of the variance in the administrative salaries

(The calculation of the regional market value for the non-named positions was done as follows: The ratio of the market value of a position to one differing only in rank was estimated. This was done by calculating the ratio of salaries for each pair of people in positions that differ only by rank [e.g.. Director of Institutional Research / Associate Director of Institutional Research]. The average of these ratios was then calculated and used as the ratio of the market value of positions differing only by rank. Using this factor we then estimated the market value of positions not listed in the CUPA study. This was done by taking the average market value of positions used in the CUPA study that were similar to the target position and then adjusting the market value for the rank of the target position.)

We measured the individuals education by their highest degree. We categorized the individuals highest degree as beginning, intermediate or terminal and included a dichotomous variable for medical doctors. We used years at the institution as a surrogate for professional experience. (This is not a very good surrogate, however, the only other measure we had available was the individuals age which cannot legally be used in determining salary.)

The measures that showed a significant effect on our model were the regional market value, the rank of the position, the highest degree the individual holds (both as a trichotomous variable and as a dichotomous variable for medical doctors), and the number of years the individual worked here. There was a quadratic effect for rank and interactions between rank and the trichotomous highest degree, and between rank and number of years here. In both cases the

higher the individual's rank the less effect the other variable had on their salary.

Using these variables, the university-wide model explained 77% of the variance in salaries. This was true regardless of whether we used a linear salary and a linear market value or a logarithmic salary and a logarithmic market value. After converting the residuals of the log-log model back to dollars and adjusting the mean to zero, the residuals had very similar distributions. Thus, we averaged the residuals for the analysis of the effects of the management areas and the effects of sex, race and age. When we included the management area we were able to explain 81% of the variance in the salaries of the administrative faculty.

Discussion

There are several major purposes for the amount of salary given an individual. At the managerial focus, there is a need to support management in a systematic fashion. This requires that the salaries obtain and retain qualified personnel. It requires that the salaries and raises motivate people with their fairness and do this by rewarding good work as assigned. The salary will also need to recognize the time spent on assigned tasks, the amount of effort, and the complexity of the position. Finally, it is hoped that the salary and the salary structure will avoid causing the organization to loose law suites.

The result of a salary structure which does not accomplish the purposes noted above may fail to do so for several different reasons.

- **Equity**: Differences in salary are related to illegal factors such as gender.
- **Competitiveness**: Salaries in a major management area cannot attract or retain qualified personnel.
- **Compression**: Salaries do not increase for more senior personnel in a career track.
- **Comparability**: Salaries in a subgroup fail to maintain the proper relationship to salaries of those in other subgroups.

Difficulty in establishing a specific solution for providing the proper salary structure and providing individuals with correct salaries comes from the interaction of the four concepts noted above. Adjusting salaries for one of the issues will often cause difficulties to increase with at least one of the other concepts. For example if an institution moves to make the entering salaries more competitive, they will produce compression among those with greater experience. In some cases, this compression becomes so severe that it is seen as **Inversion**. Moving to make one group of faculty more competitive will most likely cause a decrease of comparability.

The difficulty is increased by the influence of institutional definitions on the definition of the terms. Equity is basically defined by the courts (Rosenthal and Yancey, 1985). The other terms, however, are greatly determined by local goals and definitions and values. In an institution which pays for performance to a standard, there is no problem with average salaries which do not increase with experience. In an institution where all faculty are considered to be interchangeable, then the lack of competitiveness in groups such as computer science is not a problem. All of this is to demonstrate that the study of faculty salaries is complex, context dependent, and, with its personal association to money, often confrontational.

Warning!. Before proceeding on any study of administrative faculty be sure the study is requested and supported at the highest administrative levels. In most cases this would mean at least the level of Provost and/or Executive Vice President. In some schools the sponsorship of the President may be required. In any case the sponsor/s must be allowed to approve every decision made in the study. Remember, it is their study; they will be the ones who will act (or not act) on the results of the study.

The support of the senior administrators will come from there ability to understand the study and the concurrent participation through themselves and their key managers. We worked on three

things to support the participation of others in the study: a conceptual model, a set of shared values about the study, and a consistent effort to explain the statistics in a graphic format.

The conceptual model is shown in Figure 1. This identifies the three concepts of Professional Maturity, Performance Merit, and Professional Market as the defining components of the salary model. These three concepts allowed us to identify the measures we would like to have and also to then extend that to the variables which were present and the variables which were not available. Further, they were the mechanism which allowed us to develop several variables for the study. Finally they provided a idea based process for the disagreements among some of the key personnel as to what we should be paying people for at the university.

The primary shared value was that there should not be salary differences attributable to gender or race. Personal values included the belief that progress to proper salaries can be made incrementally. In this pursuit, reasoned judgment is more important than statistics. While no study will produce a consensus that everyone's salary is "FAIR" it is important to make salary decisions part of the management and governance decisions. These decisions should consider current legality, ethical morality, and financial reality. If there is not legality, someone might sue successfully. Ethical morality is a type of social contract that if we pay people properly, then better things will happen. The financial reality is that there is not enough money and what there is needs to best obtain and retain quality personnel. Within this frame work, it is obvious that addressing one of the issues described in the introduction acts to the detriment of other issues.

The two values which were most debated in our situation were the role of professional maturity and the amount of value of various positions. In terms of the role of professional maturity, the question was "Should a person with more experience be paid more than someone with less maturity?" This question then moves into the question of the inclusion of measures of years of experience in various positions. In the second issue, the questions evolve from the

lack of a clear comparability between our positions for a given title and the same position in the most comparable group. Obviously some of our individuals were paid less that those with a similar title in the CUPA group. In fact some entire senior management areas had lower salaries. Did this come from the unique characteristics of the position responsibilities at our university? Are some of our senior management areas less demanding because of the characteristics of the university? Obviously the answer to these questions is YES-SORTA with the SORTA being KINDA judgmental. The co-variation of some of the senior management areas with some of the characteristics of most interest is why we did the modeling of residuals on the local management areas and then the analysis of residuals based on subgroup characteristics. This procedure seemed to best identify and clarify the actual differences in our salary structure while maintaining the focus on the differences which could only be attributed to the characteristics of concern.

The operational assumptions of the study include the belief that the statistical analysis is of value only to address group issues. It does not address individual issue. Even at the group level, the statistical analysis with the individual as the unit of analysis requires a complex and robust data base. The traditional payroll data bases fall rather short both in terms of data reliability and content validity. The second belief is that when other factors are equal, with an adequately large sample, consisting of subgroups who have a homogenous reward structure, and with the specification of the proper form of the model, then the distribution of the residuals from the analysis will have the same basic distribution for various subgroups based on gender, race, or similar membership characteristics. This of course requires statistical judgments of adequate size, appropriateness of models, and the seriousness of non-comparable distributions (though this can also be investigated statistically).

The two main graphic figures which dealt with the methodology are shown as figure 2 and figure 3. These seemed to best explain the model building which come from regression as a

process of sequential adjustments to the salary. These adjustments give the residual and Figure 3 shows how the residual is viewed in terms of the resulting distribution of residuals about the expected salaries. A final figure had to do with the results of the residuals. This strategy is shown in Figure 4 and Figure 5. Figure 4 shows what the distribution might look like if there is not an issues of differences in subgroup residuals. Figure 5 shows what might be seen where there is a difference in salaries.

Conclusion

Some models look primarily at discrimination being unequal pay for equal work. Others include unequal opportunity for advancement in their definition of discrimination. Johnson et al (1987) compares these two approaches for various regression models. Smart (1991) uses path analysis to explain the different forms of discrimination. Carter et al (1984) used discriminate analysis and canonical analysis in an attempt to explain discrimination. Sagaria and Johnsrud (1992) attempted to determine whether discrimination occurs in administrative faculty promotions. However, they failed to distinguish between promotions and lateral transfers thus making it impossible to define the proper reference group to determine if discrimination occurred.

What we did is a start at better understanding the appropriateness of administrative salary structures. The requirement is for more studies, better definitions, better data bases both within and across institutions, and more studies with shared discussions. Above all, it requires a continued use of values, concepts, and data to properly address the issue of administrative faculty salaries. This study should give empirical support to those who wish to use statistics for this purpose.

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Figure 1

Salary Factors

Biases:
Annual Raise
Demand for Skills
Retirement Vacancies
Funds for New Personnel
VP/Department Aspirations
Institutional Mission

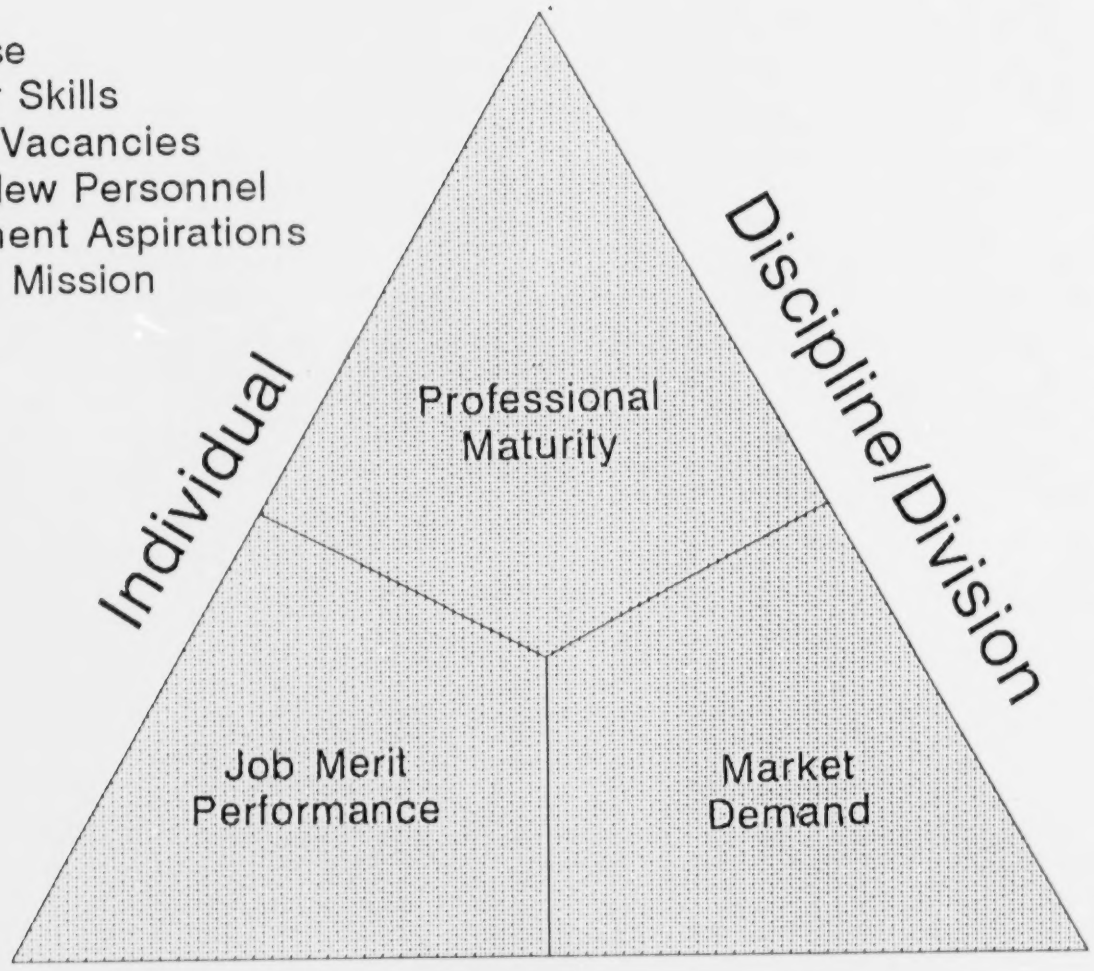
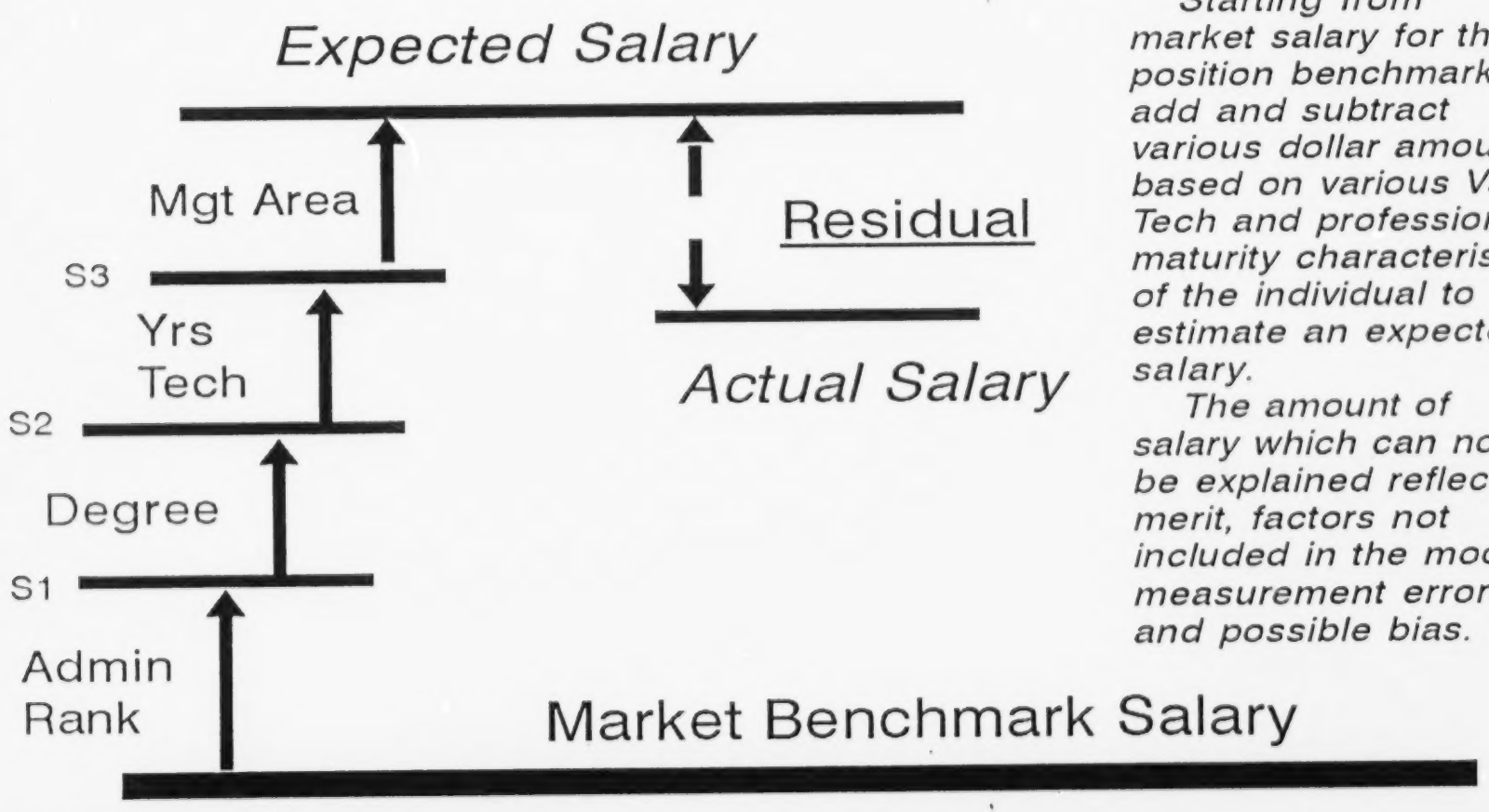


Figure 2

Estimation of Individual Salary
Residual = (Actual - Expected)



Starting from market salary for the position benchmark, add and subtract various dollar amounts based on various Va Tech and professional maturity characteristics of the individual to estimate an expected salary.

The amount of salary which can not be explained reflects merit, factors not included in the model, measurement errors, and possible bias.

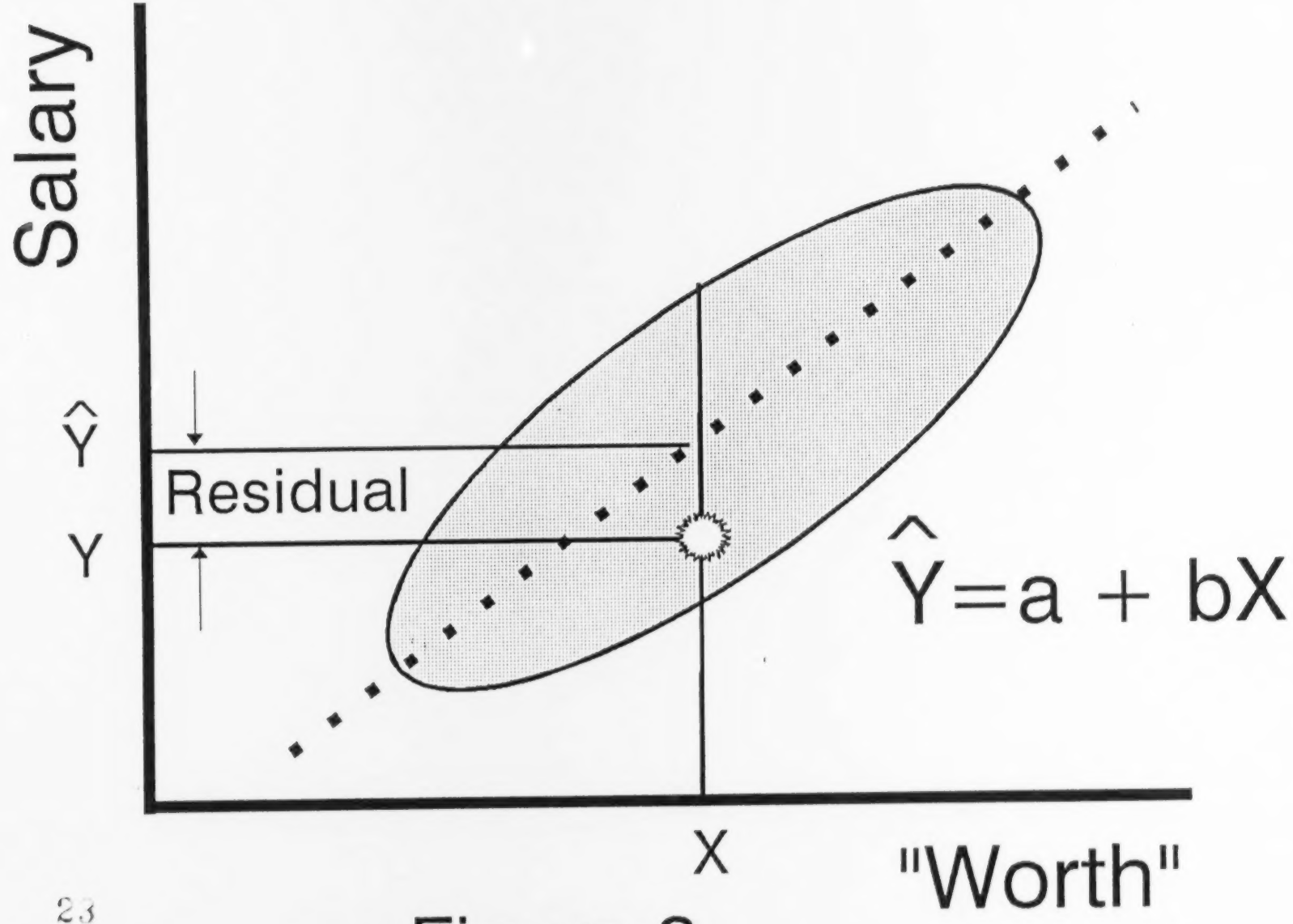


Figure 3

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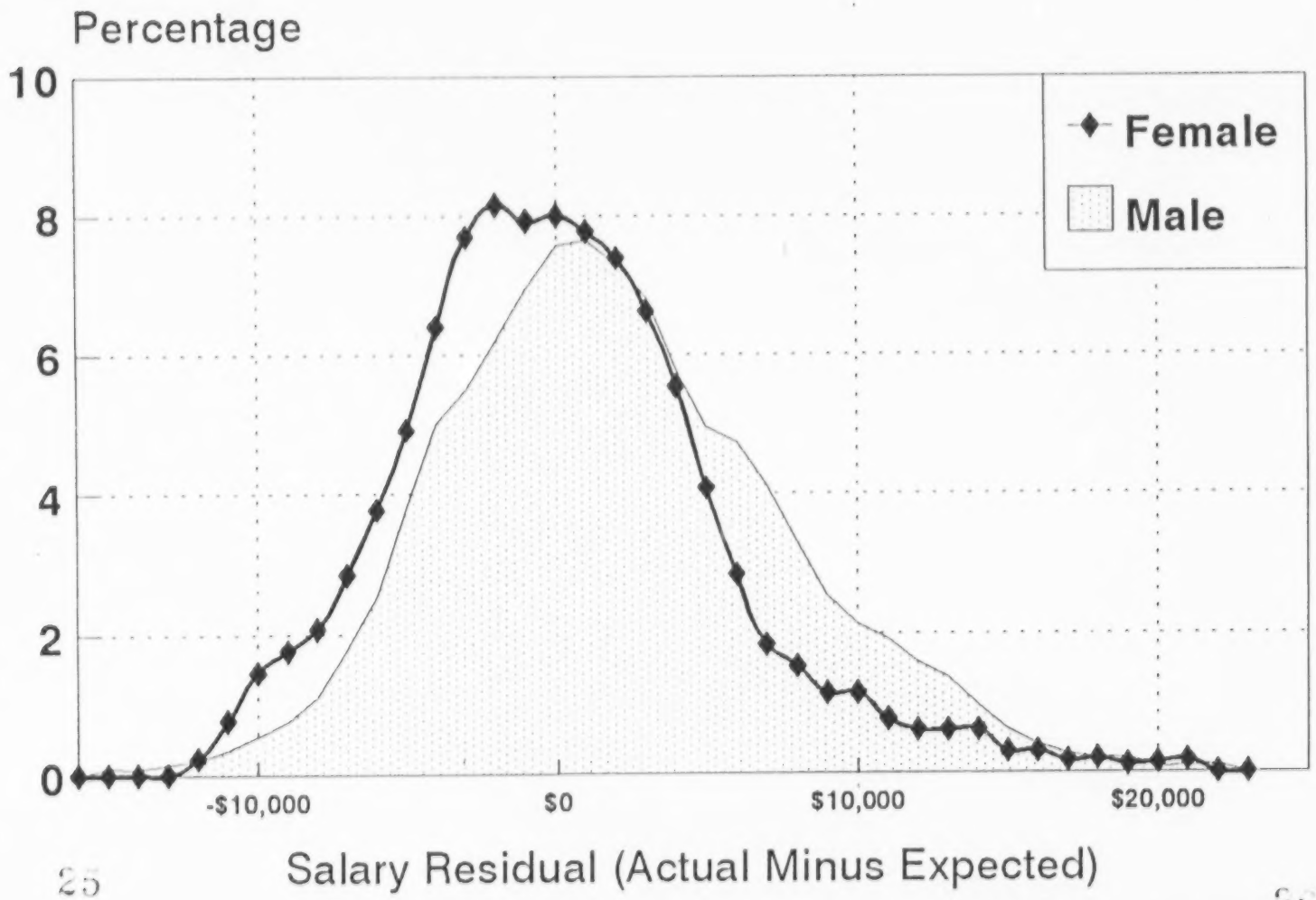
Distribution Of Smoothed Salary Residuals
Figure 4



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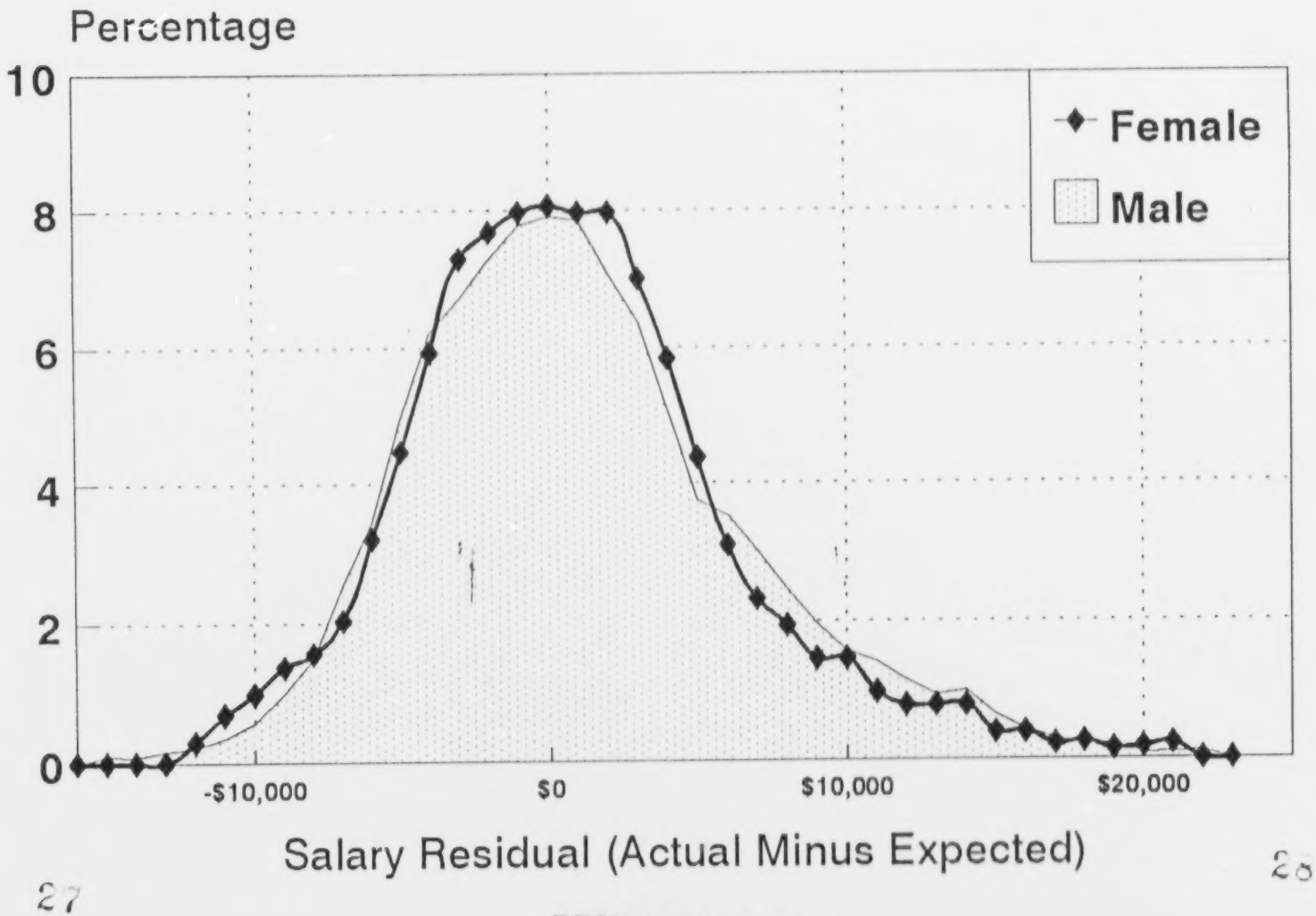
Distribution Of Smoothed Salary Residuals
Figure 5



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